Claims

What is claimed is:

1. A heteroscopic turbine with a Knudsen number of less than 10.

2. A heteroscopic turbine that generates a flow from a gas, molecules in said gas characterized by a mean free path distance, comprising:

a moving surface; and

a plurality of turbine blades on or in said surface, each of said blades having a height comparable to said mean free path distance, said blades spaced apart by a distance comparable to said mean free path distance.

3. A heteroscopic turbine as in claim 2, wherein in operation said surface moves such that said turbine blades pass through said gas at a speed comparable to a mean thermal velocity of molecules in said gas.

4. A heteroscopic turbine as in claim 3, wherein said blades are arranged on chips that are attached in or on said disk.

5. A heteroscopic turbine as in claim 4, wherein said blades are attached directly in or on said disk.

6. A heteroscopic turbine as in claim 3, wherein when said turbine spins, tops of said blades form a direction selection plane that filters molecules moving toward said disk and generates a flow from said molecules.

7. A heteroscopic turbine as in claim 6, wherein said flow creates forced convection in a direction of said flow, thereby transferring heat in a direction of said flow.

8. A heteroscopic turbine as in claim 3, wherein said blades are formed by edges of holes in said surface.

9. A heteroscopic turbine as in claim 3, wherein said blades are angled planes projecting from said surface with openings for molecules to pass at angles formed between said planes and said surface.

10. A heteroscopic turbine as in claim 9, further comprising ducting to transport molecules that have been selected by said blades.

11. A heteroscopic turbine as in claim 3, wherein said blades have at least two different heights, and

wherein when said turbine spins, tops of said blades having a first height form a direction selection plane that filters molecules moving toward said disk, and tops of blades having a second height form a speed selection plane that filters molecules based on mean thermal velocity;

whereby hotter and cooler molecules are sorted.

12. A heteroscopic turbine as in claim 11, further comprising ducting to transport said hotter molecules, said cooler molecules, or both said hotter and said cooler molecules.

13. A heteroscopic turbine as in claim 11, further comprising surfaces that reflect said hotter molecules or said cooler molecules away from said surface.

14. A heteroscopic turbine as in claim 11, further comprising baffles between rows of said blades.

15. A heteroscopic turbine as in claim 11, wherein said blades are curved concavely in a direction of motion through said gas.

16. A heteroscopic turbine as in claim 3, wherein said blades are stacked in layers, a top one of said layers preferentially capturing cooler molecules, and a bottom one of said layers preferentially capturing hotter molecules;

whereby hotter and cooler molecules are sorted.

17. A heteroscopic turbine as in claim 16, further comprising ducting to transport said hotter molecules, said cooler molecules, or both said hotter and said cooler molecules.

18. A heteroscopic turbine as in claim 16, further comprising baffles between rows of said blades.

19. A heteroscopic turbine as in claim 16, wherein said blades are curved concavely in a direction of motion through said gas.

20. A heteroscopic turbine as in claim 3, wherein said blades are angled planes projecting from said surface, with openings for cooler molecules to pass at angles formed

between said planes and said surface, and with opening for hotter molecules to pass through said surface;

whereby hotter and cooler molecules are sorted.

21. A heteroscopic turbine as in claim 20, further comprising ducting to transport said hotter molecules, said cooler molecules, or both said hotter and said cooler molecules.

22. A heteroscopic turbine as in claim 20, further comprising baffles between rows of said blades.

23. A heteroscopic turbine as in claim 20, wherein said blades are curved concavely in a direction of motion through said gas.

24. A heteroscopic turbine as in claim 3, wherein said blades are thicker at their bases.

25. A heteroscopic turbine as in claim 3, wherein said moving surface is a rotor that rotates between two stators.

26. A heteroscopic turbine as in claim 25, wherein one of the two stators includes barriers positioned such that hotter molecules pass through said rotor to one side of said barrier and cooler molecules pass through said rotor to another side of said barrier;

whereby hotter and cooler molecules are sorted.

27. A heteroscopic turbine as in claim 25, wherein one of the two stators includes barriers arranged in pairs, each pair arranged such that hotter molecules pass through said rotor

to outside of said pair of barriers and cooler molecules pass through said rotor to between said pair of barriers;

whereby hotter and cooler molecules are sorted.

28. A heteroscopic turbine as in claim 25, wherein the rotor flies over at least one of the stators due to Eckman airflow, magnetic levitation, or both.

29. A heteroscopic turbine as in claim 25, further comprising ducting to transport molecules that have passed through said rotor.

30. A heteroscopic turbine as in claim 25, wherein said rotor includes angled surfaces for redirecting hotter molecules or cooler molecules radially.

31. A heteroscopic turbine as in claim 25, wherein input ports in one of the two stators are funnel shaped.

32. A heteroscopic turbine that sorts hotter molecules and cooler molecules, wherein a ratio of work done on the molecules to a mean difference in speeds between the hotter molecules and the cooler molecules is less than 3.1.